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Using Time-Driven Activity-Based Costing to Support Performance Measurement in Estonian University Libraries: A Case Study for Acquisition Process

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Abstract

Libraries today are included in the general demand for cost transparency and effective cost management. In the current socio-economic situation, it is challenging to cope with the same or reduced resources in managing the same processes and activities, so that the quality of the result would not be affected. The need of library managers to justify their costs to their parent organizations has become particularly important, perhaps even more important than ever in the history. With the data they have traditionally collected, libraries can assess details about the costs of collection building; what they need now are reliable data about the costs of their services and products. However, libraries lack a specific overview of the activities between which their costs are divided. Cost accounting is the simple process of breaking down resources to the activity being carried on and then collating the monetary cost to show the cost of the activity. The time-driven activity-based costing TDABC helps to get a better picture of the acquisition related activities that libraries are actually engaged in and their costs.

The purpose of the present paper is to analyse the cost of activities related to acquisition process in Estonian university libraries based on the example of the time-driven activity-based costing (TDABC) method. More specifically, the study concerned both the acquisition process of foreign as well as domestic documents in physical carriers – books, audiovisual documents and printed music documents. Only documents acquired as purchases were added.

While analysing the results, it appeared that the difference in time consumed for purchasing a document can be remarkable and it concerns, first and foremost, acquiring foreign documents.

Litearure Review

Diedrichs & Schmidt say that „Acquisitions is the process of acquiring library materials. Acquisitions includes *all* tasks related to obtaining *all* library materials“. „Acquisitions“ has replaced order work since some materials are acquired without being ordered (e.g., thorough gifts, donations, exchange, legal deposit copy). Acquisitions department is found in most libraries, generally as a unit within technical processes, collection management, collection development, but often, however, as the independent department (Diedrichs & Schmidt, 1999). In smaller libraries, of course, there is no separate acquisitions department, the acquisition process is administrated by acquisition librarian.

G. A. Marco states that the acquisitions procedure is labor intensive. He suggests that probably one person-hour, at least, is required to deal with a single item (Marco, 2003, p. 3). Librarians have given some, but not much attention the expediting the acquisitions routine. A lot has been talked about the centralization of library operations since the end of the 19th century (e.g. Bliss, 1927; Cronin, 1966; Dawson, 1957; Dewey, 1876; Jewett, 1851; Richardson, 1931). In 1948 Ralph Ellsworth proposed that the Library of Congress become the centralized cataloging agency for the entire country; his plan called for it to undertake the cataloging of all new books added to the libraries of the United States. But the biggest problem involved in centralized acquisition was that if, for example, the Library of Congress would have taken responsibility for centralized acquisition, it could have found it necessary to charge for the full cost of cataloging the titles which its library did not itself acquired (Dawson, 1957, p. 2).

The routines of acquisitions have been fairly well fixed over the years. Another important timesaving method, very popular since 1960s, has been sharing the work with vendors (agents, bookshops etc.). Automation of vendor activities has been extensive since 1980s. Major vendors have compiled databases of materials in many categories, ready for librarians to examine in the selection and acquisition processes. Nowadays, all innovative bookshops offers an opportunity to order documents electronically, via their websites. Item titles are interactive, allowing direct click-on ordering of desired materials. This kind of order process saves the staff time (Diedrichs & Schmidt, 1999). There are certain bookstores that indeed offer a service to avoid duplicating orders. For instance, the website of a Estonian bookshop, Krisostomus, instantly displays a message while placing a duplicate order: "You have already ordered this book" (on this date and in this year).

Stouthuysen *et al* state that „Though digital libraries began more and more to be developed, the print format books – both scientific books and textbooks - are still very important for university libraries and continue to pour into acquisition activities. Not only the levels of responsibility and time spent on activities related to digital resources but also to nondigital resources have increased compared to 5 years ago. One reason for this is that print and digital formats each have exclusive values, and until those values can be replicated in other media, both formats must be collected, maintained, and supported by libraries. Print formats have independent value and contain centuries of information not yet available in digital formats" (Stouthuysen *et al* 2010, p. 84).

For research librarians is the cost of acquiring and maintaining a collection a very important issue. While purchase costs are easy to identify, associated acquisition expenses are difficult to measure and attribute to specific collections. Cataloging has always been considered one of the most expensive areas of library work. Still, the costs of acquisition process have been researched less, and it has been predominantly done as a part of the general cost accounting study of the library.

According to Robert M. Hayes, accounting is the oldest among the tools of performance management, dating back to at least the Renaissance. A modern performance management required more detailed cost data than existing budgetary accounting provided. This led to the development of cost accounting systems, which related costs to the work performed (Hayes, 2001, pp. 3-4).

The activity-based costing (ABC) method is the best-known management accounting innovation of the

last twenty years (Wegmann, 2009). It was originally used in the manufacturing sector in response to dissatisfaction with traditional management accounting techniques. The ABC takes into account the cost incurred at the activity level and then attributes the cost to products according to the activities that a product goes through (Spedding & Sun, 1999, p. 291).

The ABC is a logical approach to the management of the organization, which helps to clarify and to assess an organization's processes and identify their cost (Ellis-Newman, 2003). The idea behind activity-based costing is simple and logical – costs and expenses do not arise automatically; charges and expenses are incurred as a result of management activities. There is no cost inside the organization; there are only activities carried out for customer service, which in turn lead to charges.

Time-driven activity-based costing (TDABC) method was designed in the USA in the beginning of 2000s by Robert Kaplan and Steve Anderson. Based on the several approaches and studies (Kaplan & Anderson 2004, Kaplan & Anderson 2007, Pernot *et al*, 2007) TDABC is a revised, easier version of the ABC. The TDABC model can be estimated and installed quickly as only two parameters are required: 1) the number of time units (e.g., minutes) consumed by the activities related to the cost objects (the activities the organization performs for products, services, and customers), and 2) the cost per time unit. Hence, the TDABC systems can be implemented more quickly (and thus more cheaply), as well as updated more easily than the traditional ABC. In other words, it is necessary to determine the capacity cost rate and the use of capacity of the implemented activities carried out by each subunit. Both parameters are easily identifiable. Practical capacity is often estimated as a percentage, for instance, 80% or 85% of theoretical capacity. That is, if an employee can normally work 40 hours per week, practical capacity could be assumed to be 32 hours per week. This estimate allows for 20% of personnel time for breaks, arrival and departure, and communication and reading unrelated to actual work performance. It is also very important to stress, though, that the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity (the time required to process one order: for example, how much time it takes to deal with one interlibrary loan request – order reception, request handling, and transmission of orders). Knowing the real (practical) capacity of the resources used and the time spent on activities, it is possible to determine the cost of each activity by multiplying the time spent on activities by the practical capacity of the resources (Kaplan & Anderson, 2004; Kaplan & Anderson, 2007; Pernot *et al*, 2007).

Course of the study

The study was conducted in a Tallinn University of Technology Library (TUT Library) and in the Estonian Academy of Music and Theatre Library (EAMT Library). Both selected libraries are university libraries governed by public law. These libraries were chosen because they are funded on a similar basis, they perform the same functions and their main aim is to support high quality education and to increase the state's potential for ongoing scientific discovery and development.

However, selected university libraries are quite different from each other. As TUT Library is an extremely book-centred library, then the documents included in the survey were only books. Most of the recent additions to the Library's collection in 2013 (9, 077 in total) were books, manuscripts and serials. 229 annual sets of periodicals were added. Other modes of documents were notably less

represented. 80 standards and 36 maps were registered. No printed music documents were added in 2013. 142 copies of audiovisual documents were added in total. 3,800 documents were added to the collection as purchases.

The collection of the EAMT Library largely consists of printed music documents and audiovisual documents. Most of the registered documents of 2013 (4,552 in total) included printed music documents (2,560), books and manuscripts (1,199). 758 audiovisual documents and 35 annual sets of periodicals were registered. 2,607 documents were added to the collection as purchases.

In accordance with the analysis of the previously conducted research, the study was divided into the following stages: identification of key activities, identification of all resources, involved in the process, identification of the capacity cost rate and determination of time spent on activities.

In the first phase, all the staff members involved in this work process, as well as their general duties and those specifically related to acquisitions were mapped. On the basis of the descriptions of the staff and interviews conducted with them, and the analysis of the documents, all the activities that have to be done with a book during the ordering and receiving process were determined and recorded.

Making decisions on purchasing documents in foreign languages for TUT Library completely differs from that of making decisions on purchasing documents in the Estonian language. Therefore also the number of activities was very different in the case of the purchasing foreign documents and in the case of the purchasing domestic documents. Ten activities in the case of the purchasing foreign documents and only three activities in the case of the domestic documents in TUT Library were recorded. Ten activities in the case of the purchasing foreign documents and eight activities in the case of the domestic documents in EAMT Library were recorded.

As a result of this stage, filled questionnaires of participant observation was prepared. In the filled questionnaires, prepared on the basis of job descriptions and interviews with employees, the staff members were asked to undertake self-observation, that is, to record the time spent on a specific activity in the observation report. The questionnaire also enabled to add notes. Stopwatch was recommended to measure the time as exactly as possible.

The next step was the study of library statistics for identification of the resources. The statistical reports of activities of 2013 were used to determine the numerical data on the staff, expenditure, working days and working minutes in month derived from days, size of the collection, and additions.

Eight staff members are involved in acquisition of documents in foreign languages at TUT Library, and three staff members at the EAMT Library. Two staff members respectively, acquire domestic documents in both libraries.

Any library is aware both of the cost of every document, as well as the average value of acquired documents. The operating expenditure of libraries are divided according to the Standard of International Library Statistics as follows: salaries and wages, acquisition costs, administrative costs, collection maintenance costs, communication technology costs, interlibrary loan costs and other expenses (heating, lighting, electricity, etc.). However, because the goal of the survey was to

calculate, the costs connected directly with the acquisition process of the documents, then the acquisition costs were not included while defining the cost of capacity supplied. It also seemed unnecessary to determine the specific amount of wages of every staff member involved in acquisition, as all of them have also other duties to perform. Thus, the general labour costs of the library and the number of the library staff were selected as the basis of the present survey. The costs of the interlibrary loan service were not separately highlighted, too. Operating expenditure (except for acquisition expenditure) were 141,775 EUR in the EAMT Library and 925,300 EUR in TUT Library. For the identification of the capacity cost rate, the practical capacity of resources (employees) was calculated, based on the number of staff members involved in the work process and the average working minutes in month per employee of the library in the financial year prior to the study. The fact that 22 percent of working time is spent on non-productive activities that falls within the limits suggested by the authors of the TDABC method was also kept in mind.

As the result, the capacity cost rate in EAMT Library and in TUT Library was calculated.

Finally, the cost of every activity and the cost of the whole work process in total were calculated. The time spent on the activity was multiplied by the capacity cost rate to reach the cost of the activity.

Results

While ascertaining the key activities of acquisition process, it appeared that the activities differ both between the libraries as well as the documents concerned. A relatively time-consuming activities in both libraries are receiving the order, transferring the order to the supplier, registering the reception of the document.

On the average, purchasing of documents published abroad is approximately 91 percent more time-consuming and therefore more expensive than purchasing domestic documents at TUT Library. The large difference in time consumption is conditioned by the fact that the TUT Library makes its decision on purchasing domestic documents on the basis of the weekly exhibition of legal deposit copies. Although employees from the Information Services Department, and from the Library Services Department make their recommendations, the acquisition librarians have the final say, what to acquire. The acquisition process of documents in foreign languages for TUT Library completely differs. Because the process is divided between the two departments, it is too complicated and time consuming. Solution would be that the orders from academic staff and students come directly or via „Send a suggestion“ or via „Ordering new books“ forms to the acquisitions librarian. Resulting from the large difference in time consumption, the difference in the financial cost also turns out to be big – when the average cost of cataloguing a document in the foreign language is €9.12, then the average cost of cataloguing a domestic document is only €0.8.

There occurs no such amount of difference in time consumption and costs while speaking of the EAMT Library. The acquiring of documents in foreign languages takes only approximately 33 percent more time and money than the acquiring of domestic documents here. The average cost of acquiring a document in the foreign language is €2,14 and the average cost of acquiring a domestic document is €1,45.

The purchasing of foreign documents in TUT Library takes approximately 78 percent more time and money than in EAMT Library. However, in the case of the purchasing of domestic documents the situation is reversed – in EAMT Library it takes approximately 40 per cent more time and money than in TUT Library.

Conclusions

Because the words “efficiency” and “productivity” are not culturally accepted in the context of library, TDABC is an appropriate method for the evaluation of the library work:

- in the case of the TDABC, the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity;
- the TDABC model can be tested and implemented by departmental managers for each separate library department or for each work process;
- the TDABC already considers many aspects that affect employees’ efficiency and performance, e.g., rest periods, personal time for breaks, arrival and departure, and communication and reading unrelated to actual work performance.

The TDABC is well suited for a library setting, involving many activities with complex time drivers. The TDABC seems to be one of the best tools for understanding cost behavior and for refining a cost system for university libraries. This is also a great method for mapping the organizations’ activities and processes. Although the documenting the activity flows and data collection to gather the time duration can be time-consuming for researcher, and uncomfortable for the staff of being observed, it enables to seek out how it would be possible to shorten the time consumed for certain activities and, by this, turn it more cost-effective without damaging the work quality. While integrating the TDABC method with the analysis of library performance indicators, the more valuable data is possible to produce for managerial decisions.

Library personnel willingly participated in the time measurements. Identifying the staff members involved in the acquisition process and seeking out the activities they were engaged in was swift and the course of the study understandable to all its participants.

Finally, it should be emphasized that no method of measurement can not give all answers and the final truth. There are intangible factors in the library work that no cost accounting system can ever reach. Although through the decades there have been several endeavours place the library work under factory-wise standardized product so, that library staff can be worth their salaries, it has not been fully successful. In and of itself no cost system can cut costs. All it can do is to show the administrator where costs may, and should, be cut. However effective a tool cost accounting may be, it is only a tool. And no tool does work unless it is used, and every tool does its best work in the hands of a skilled employee.

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